

## Message Text

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TAGS: ENRG

SUBJECT: RESPONSES TO QUESTIONNAIRE ON NATIONAL NUCLEAR  
POWER PROGRAMS

1. WHAT ARE YOUR CURRENT TARGETS FOR 1980, 1985, AND 1990

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FOR NUCLEAR GENERATING CAPACITY (MWE) IN RELATION TO  
TOTAL ELECTRICAL PRODUCTION (TWH)?

NUCLEAR PROJECTIONS (MODERATE-LOW CASE) ARE:

1980 MWE - 75,800 TWH - .433

1985 MWE - 185,000# TWH - 1.085

1990 MWE 340,000 TWH - 1.977

# NOTE: SOMEWHAT HIGHER THAN PROJECT INDEPENDENCE ESTIMATE.

2.A. TO WHAT EXTENT DO YOU ESTIMATE THESE NUCLEAR PROGRAMS WILL ECONOMISE ON NATIONAL OIL IMPORTS IN THE YEARS 1985 AND 1990?

ALL FORMS OF ENERGY ARE BEING UTILIZED AND EXPANDED AS RAPIDLY AS IS FEASIBLE, AND THEREFORE, NUCLEAR POWER MAY BE CONSIDERED AS REPLACING OIL IMPORTS. THE OIL IMPORT SAVINGS FOR THE "MODERATE LOW" ESTIMATE COMPARED TO "LOW" ESTIMATE IS GIVEN:

MILLIONS OF BARRELS OF OIL PER YEAR:

YEAR 1985 OIL EQUIVALENT OF MODERATE-LOW CASE 1810.  
YEAR 1985 OIL EQUIVALENT DIFFERENCE LOW CASE VS. MODERATE-LOW CASE 270. YEAR 2000 OIL EQUIVALENT OF MODERATE-LOW CASE 3300. YEAR 2000 OIL EQUIVALENT DIFFERENCE LOW CASE VS. MODERATE-LOW CASE 512.

2.B. WHAT WILL BE THE SHARE OF NUCLEAR ENERGY IN THE TOTAL PRIMARY ENERGY CONSUMPTION IN 1980, 1985, AND 1990?

YEAR 1980 SHARE OF PRIMARY ENERGY FOR NUCLEAR POWER ()  
5.0, TOTAL ENERGY (10 TO THE 15 POWER BTU) 89.7.  
YEAR 1985 SHARE OF PRIMARY ENERGY FOR NUCLEAR POWER ()  
10.7, TOTAL ENERGY (10 TO THE 15 POWER BTU) 104.8.  
YEAR 1990 SHARE OF PRIMARY ENERGY FOR NUCLEAR POWER ()  
16.3, TOTAL ENERGY (10 TO THE 15 POWER BTU) 122.6.

3. HOW DO YOU PROPOSE TO SUB-DIVIDE YOUR NEW NUCLEAR CAPACITY BY REACTOR TYPE? WE EXPECT THAT TECHNOLOGICAL AND MARKET FORCES WILL RESULT LWR'S BEING DOMINANT THROUGH 1980 WITH A MIX OF 2/3 PWR'S AND 1/3 BWR'S.  
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HTGR'S WILL APPEAR COMMERCIALY ABOUT 1981 AND WILL CAPTURE 15 OF THE MARKET BY 1990. COMMERCIAL BREEDER REACTORS WILL NOT BE INTRODUCED UNTIL THE MID-90'S.

4. WHAT CONSTRAINTS (IN ORDER OF SIGNIFICANCE) DO YOU EXPECT TO ENCOUNTER IN THE ACHIEVEMENT OF THE ABOVE NUCLEAR PROGRAMS?#

- A) FINANCING PROBLEMS
- B) ELECTRICAL LOAD GROWTH UNCERTAINTIES
- C) REGULATORY AND PUBLIC ACCEPTANCE PROBLEMS
- D) URANIUM AVAILABILITY
- E) CONCERN ABOUT THE "BACK END" OF THE FUEL CYCLE (REPROCESSING, PLUTONIUM RECYCLE INCLUDING SAFEGUARDS, AND WASTE MANAGEMENT)
- F) URANIUM ENRICHMENT CAPACITY
- G) NUCLEAR PLANT RELIABILITY

# ORDER OF SIGNIFICANCE IS IMPOSSIBLE TO DETERMINE  
5: TO WHAT EXTENT DOES EXISTING ACTIVITY IN INTERNATIONAL BODIES, OR IN THE EUROPEAN COMMUNITY, SEEM LIKELY TO YOU TO EASE THESE CONSTRAINTS?

CONSTRAINTS WILL BE EASED BY THE SUCCESS OF THE FOLLOWING PROGRAMS:

A) IEA (R&D SUB-GROUP) - COOPERATIVE PROGRAMS ON

NUCLEAR SAFETY, RADIOACTIVE WASTE MANAGEMENT, AND CONTROLLED NUCLEAR FUSION.

B) IEA (ENRICHMENT URANIUM SUPPLY SUB-GROUP). - TASKS BEING CONSIDERED INCLUDE ATTEMPTS TO IMPROVE THE AVAILABILITY OF ENRICHMENT SERVICES AND THE IDENTIFICATION AND STIMULATION OF NEW NATURAL URANIUM SOURCES

C) IAEA - NUCLEAR SAFEGUARDS, PHYSICAL SECURITY

D) OECD/NEA - EXPERIMENTS TO INCREASE RELIABILITY OF POWER REACTORS, USING VARIOUS FUEL MIXTURES TO INCREASE EFFICIENCY OF REACTORS, HARMONIZATION AND STANDARDIZATION OF REGULATORY ISSUES.  
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6. IN THE LIGHT OF YOUR ANSWERS TO THE FOREGOING FIVE QUESTIONS, WHAT FUNCTIONS DO YOU SUGGEST FOR THE AGENCY IN THE NUCLEAR FIELD?

A. NATURAL URANIUM RESOURCES

1. RESOURCE ASSESSMENT

THE SUPPLY/DEMAND BALANCE OF NATURAL URANIUM IN THE MID- AND LONG-TERM DEPENDS ON A LARGE NUMBER OF VARIABLES INCLUDING ACTUAL GROWTH OF THE NUCLEAR POWER INDUSTRY, AVAILABILITY OF PLUTONIUM RECYCLE, LARGE-SCALE INTRODUCTION OF BREEDER REACTORS, AVAILABILITY OF ENRICHMENT CAPACITY, SUCCESS IN EXPLORATION FOR AND DEVELOPMENT OF NEW URANIUM DEPOSITS AND THE TIMELY INSTALLATION OF MINING AND MILLING INFRASTRUCTURE.

THE SUGGESTED ACTIVITY WOULD BUILD ON THE INFORMATION COLLECTED IN THE SEUS REPORT ON THESE VARIABLES AND WOULD COMPILE AN UPDATED UNIFORM AND COMPLETE DATA SET, CAPABLE OF BEING USED FOR MATHEMATIC MODELING PURPOSES. EVERY EFFORT WILL BE MADE TO COLLECT DATA FROM COUNTRIES NOT NOW MEMBERS OF IEA AND COUNTRIES THAT HAVE PREVIOUSLY BEEN RELUCTANT TO SHARE DATA.  
USE OF THE MODEL AND DISTRIBUTION OF ITS FINDINGS

SHOULD BE LIMITED TO THE EXTENT FEASIBLE TO IEA MEMBERS AND COUNTRIES AND ORGANIZATIONS PARTICIPATING IN THE DATA COLLECTION EFFORT.

EVERY EFFORT WOULD BE MADE TO UTILIZE THE FACILITIES AND SPECIAL EXPERTISE OF IAEA, OECD/NEA AND IIASA IN COMPILING THE DATA AND ASSESSING IT. DESIGN OF THE MODEL AND DETERMINATION OF THE APPLICATIONS TO WHICH IT IS PUT WOULD REMAIN PRINCIPALLY AN IEA RESPONSIBILITY.

## 2. URANIUM EXPLORATION TECHNOLOGY AND TECHNIQUES

WORLD-WIDE URANIUM EXPLORATION IS GENERALLY AT A STAGE ANALOGOUS TO THAT OF OIL EXPLORATION IN THE 1920'S; THAT IS THE URANIUM THAT CAN BE IDENTIFIED FROM LIMITED OFFICIAL USE  
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SURFACE EXPOSURES, SIMPLE GEOLOGIC ANALYSIS, AND RELATIVELY UNCOMPLICATED GEOPHYSICAL EQUIPMENT NOW HAS BEEN FOUND OR IS IN THE PROCESS OF BEING DISCOVERED. "HIDDEN DEPOSITS" EXIST THAT CAN ONLY BE LOCATED BY SOPHISTICATED GEOPHYSICAL EQUIPMENT OR COMPLEX GEOLOGIC AND MATHEMATICAL ANALYSES NOW BEING DEVELOPED. THESE DEPOSITS MAY ADD SIGNIFICANTLY TO THE WORLD'S SUPPLY OF URANIUM IF THEY ARE IDENTIFIED AND EXPLOITED.

THE US HAS LAUNCHED A MAJOR, MULTI-YEAR PROGRAM (NATURAL URANIUM RESOURCE EVALUATION OR NURE) TO DEVELOP "TARGET AREAS" IN THE US THAT MIGHT FOCUS INDUSTRY EFFORTS TO ACTUALLY LOCATE NEW URANIUM DEPOSITS. IMPORTANT COMPONENTS OF THE PROGRAM ARE R&D ON URANIUM EXPLORATION MINING AND METALLURGY, AS WELL AS IMPROVED ASSESSMENT OF POTENTIAL TARGET AREAS.

THE PROPOSED COOPERATIVE ACTIVITY WOULD LINK THE NURE PROGRAM TO RELATED EXPLORATION EFFORTS IN OTHER COUNTRIES (INCLUDING LESS DEVELOPED COUNTRIES) FOR THE PURPOSE OF INCREASING THE WORLD SUPPLY OF URANIUM.

THIS WOULD BE DONE BY:

-- EXCHANGES OF EXPERTS.

-- ON-THE-JOB TRAINING OF TECHNICIANS FROM OTHER COUNTRIES.

-- ARRANGEMENTS TO FACILITATE TRANSFER OF SELECT NUCLEAR EXPLORATION TECHNOLOGY, INCLUDING COSTLY OR SOPHISTICATED SPECIAL EQUIPMENT UNDER APPROPRIATE COMMERCIAL ARRANGEMENTS.

B. URANIUM ENRICHMENT RESOURCES

PERIODICALLY REVIEW ENRICHED URANIUM SUPPLY/DEMAND, BUILDING ON INITIAL SEUS REPORT, TOGETHER WITH RELATED NEA/IAEA STUDIES. CONSIDER COMBINING WITH NATURAL URANIUM RESOURCES REPORT PREPARED BY NEA/IAEA AND ISSUED ANNUALLY. USING THIS DATA, FORECAST IMPLICATIONS FOR IEA MEMBER LIMITED OFFICIAL USE  
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STATES, ATTEMPTING TO TAKE INTO ACCOUNT SUCH RELEVANT FACTORS AS FUTURE SOVIET SHARE OF FREE-WORLD ENRICHMENT MARKET. IN MAKING SUCH FORECASTS, THE US WOULD BE PREPARED TO CONSIDER UTILIZING COMPUTER PROGRAMS DEVELOPED BY ERDA FOR FORECASTING OF THIS TYPE, INCLUDING PARAMETRIC STUDIES WHICH MIGHT BE CONSIDERED AS DESIRABLE BY THE IEA MEMBERSHIP.  
IMPROVE COORDINATED EFFORTS TO EXCHANGE INFORMATION ON ENRICHMENT FACILITY PLANNING TO MINIMIZE RISKS OF SERIOUS OVER- OR UNDER-SUPPLY OF SUCH SERVICES. CONSIDER HOW THE IEA MIGHT COORDINATE ITS ENRICHMENT FACILITY PLANNING WITH NON-MEMBERS ALSO EXPECTED TO CONSTRUCT ADDITIONAL ENRICHMENT CAPACITY, SUCH AS FRANCE AND SOUTH AFRICA.

EXPLORE CONTINGENCY MEASURES WHICH MIGHT BE UNDERTAKEN AMONG IEA MEMBERS TO PROVIDE CONTINGENCY BACK-UP FOR LOSSES OF ENRICHMENT CAPABILITY THROUGH MAJOR DISASTERS OR OTHER UNFORESEEN EVENTS. DEVELOP POSSIBLE METHODS FOR SHARING, AS SOME FORM OF CO-INSURANCE, THE CARRYING COSTS OF ANY ENRICHED URANIUM INVENTORIES WHICH MIGHT BE A PART OF SUCH CONTINGENCY PLAN.

C. FINANCING POWER REACTORS AND SUPPORTING FACILITIES

PROJECT LONG-TERM CAPITAL REQUIREMENTS BOTH FINANCIAL AND REAL, WITHIN THE IEA FOR PROJECTED POWER REACTOR PROGRAMS AND SUPPORTING FUEL CYCLE SERVICES, SUCH AS MINING AND MILLING, FUEL FABRICATION, AND CHEMICAL REPROCESSING. IDENTIFY ANTICIPATED SHORTFALLS, ON BOTH AN INDIVIDUAL AND COLLECTIVE BASIS, IN CAPITAL AVAILABILITY WITH REFERENCE TO EXTERNAL FINANCING NEEDS ON A LONG-TERM (FIFTEEN TO TWENTY-YEAR) BASIS. ATTEMPT TO ASSESS, THROUGH ANALYSIS AND INFORMATION EXCHANGE, THOSE TECHNICAL AND REGULATORY FACTORS WHICH ADD TO THE COST OF NUCLEAR FACILITIES AND, ON THE BASIS OF SUCH ANALYSIS, DEVISE METHODS WHEREBY THEY MIGHT BE REDUCED.

EXPLORE THE POSSIBLE UTILITY AND FEASIBILITY OF IEA COOPERATION TO HELP ENSURE THE AVAILABILITY OF NEEDED CAPITAL FOR CARRYING OUT THE OPTIMUM LEVEL OF NUCLEAR LIMITED OFFICIAL USE

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POWER EXPANSION.

D. "BACK END" OF THE FUEL CYCLE DEVELOPMENT

EXCHANGE INFORMATION ON PLANS AND PROGRAMS OF IEA MEMBERS FOR SPENT-FUEL STORAGE, REPROCESSING IN EXISTING AND NEW FACILITIES, AND RECYCLING OF PLUTONIUM AND URANIUM. INCORPORATE THIS INFORMATION INTO URANIUM RESOURCE AND ENRICHMENT PROJECTIONS TO DISPLAY RELATIONSHIP BETWEEN SPENT-FUEL UTILIZATION AND URANIUM AND ENRICHMENT SERVICES SUPPLY/DEMAND.

SUPPORT JOINT NUCLEAR WASTE DISPOSAL PROJECTS DEVELOPED BY THE IEA/SLT SUBGROUP ON R&D AND OECD/NEA EFFORTS IN THIS FIELD. EXAMINE POSSIBLE PROGRAMS AMONG IEA MEMBERS IN THE AREAS OF SPENT-FUEL STORAGE, REPROCESSING FACILITIES, AND PLUTONIUM RECYCLING.

E. NUCLEAR SAFETY

EXCHANGES OF INFORMATION AND COOPERATIVE PROGRAMS IN THE FIELD OF NUCLEAR SAFETY SHOULD BE CONTINUED AND

INTENSIFIED AMONG MEMBERS OF THE IEA. IN ADDITION TO THE RESEARCH AND DEVELOPMENT EFFORTS ALREADY UNDERWAY UNDER IEA SPONSORSHIP, IT SHOULD BE AN OBJECTIVE TO SUPPORT MORE VIGOROUSLY EFFORTS UNDERTAKEN BY THE NEA, AS WELL AS THE IAEA, IN THE FIELD OF NUCLEAR SAFETY. THE IEA COULD PROVIDE A FORUM TO GIVE POLITICAL IMPETUS TO SUCH ACTIVITIES.

CONSIDERATION SHOULD BE GIVEN TO POSSIBLE DEVELOPMENT OF MINIMAL REACTOR SAFETY STANDARDS FOR THE VARIOUS TYPES OF POWER REACTORS CURRENTLY BEING MARKETING INTERNATIONALLY. ANY SUCH EFFORTS SHOULD BE COORDINATED WITH WORK ALREADY IN PROGRESS IN THIS AREA IN THE IAEA AND NEA. SUCCESSFUL DEVELOPMENT OF SUCH STANDARDS SHOULD MINIMIZE ANY COMMERCIAL ADVANTAGE WHICH MIGHT ACCRUE TO AN INTERNATIONAL VENDOR IN "CUTTING CORNERS" ON REACTOR SAFETY.

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F. PUBLIC ACCEPTANCE

INFORMATION COULD BE EXCHANGED AMONG IEA MEMBERS ON THE NATURE AND EXTENT OF PUBLIC AND LEGISLATIVE OPPOS-

TION TO NUCLEAR POWER IN THE MEMBER NATIONS. THIS  
COULD INCLUDE AN EXCHANGE OF EXPERIENCE IN THE IMPL-  
MENTATION OF REGULATORY PROVISIONS AND PROCEDURES. IT  
IS RECOGNIZED THAT THESE PROBLEMS VARY FROM COUNTRY TO  
COUNTRY, BUT IT IS BELIEVED THAT THERE ARE MANY OF A  
COMMON NATURE THE RESOLUTION OF WHICH MIGHT BENEFIT  
FROM COMMONLY SHARED POLICIES AND EXPERIENCES.

IF THE FOREGOING EFFORT DEVELOPS A CONSENSUS THAT  
THERE ARE A NUMBER OF COMMON PROBLEMS, A PROGRAM MIGHT  
BE DEVELOPED UNDER IEA SPONSORSHIP TO EDUCATE THE PUBLIC  
AND THE LEGISLATIVE BODIES AS TO THE REALITIES OF NUCLEAR  
POWER AND ITS COSTS AND BENEFITS. THROUGH COOPERATIVE  
INFORMATION AND EDUCATIONAL EFFORTS WITHIN THE IEA COM-  
MUNITY, IT SHOULD BE POSSIBLE TO ASSIST INDIVIDUAL MEMBERS  
IN THEIR EFFORTS TO DEAL EFFECTIVELY AND RESPONSIBLY WITH  
DOMESTIC INHIBITIONS TO NUCLEAR POWER. KISSINGER

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## Message Attributes

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